ICE COLUMNS IN GRAVELLY SOIL.

By E. D. BOURNE. Dated Taylorsville, Ky., February 22, 1908.

In the MONTHLY WEATHER REVIEW for October, 1907, is a notice of an article on the formation of ice columns in gravelly soil, by Professor Goto, and the statement that an endeavor would be made to get a translation, or abstract of the same.

I have been interested, in an unscientific way, in this subject for years. About thirty years ago I noticed that occasionally a tiny column would shoot up above the general level of the group. Upon investigation I found that every one of these taller columns formed on a seed of horseweed (tall ragweed), and always on the end opposite to the germ end.

I have at various times made similar examinations and always found the same result.

POPOF AND ERMAN ON THE USE OF KITES IN METEOROLOGY.

In 1893 Professor Harrington took up the development of kite work in the Weather Bureau and during the years 1895, 1896, 1897 in successive numbers of the MONTHLY WEATHER REVIEW we publisht various historical references to those who advocated or used the kite as a means of sending aloft our meteorological apparatus. We now take pleasure in referring to still another instance that has lately come to our knowledge and that is eminently worthy of being added to the record. We allude to a memoir by Prof. A. Popof, of Moscow and Kazan, published in Russian in the Journal of the Minister of Public Education for September, 1846, but known to us only thru an abstract publisht in 1849 by Prof. A. Erman at p. 374–385 Vol. VII of his Archives of Science in Russia. Altho Professor Erman is most widely known by his important works in terrestrial magnetism yet his interest in climatology is shown by many articles in his archives and on every page of his Journey Around the Globe. His profound knowledge of dynamic meteorology is illustrated by his memoir of February, 1868, on the general circulation of the atmosphere publisht in Vol. LXX of the Astronomische Nachrichten.

In the present case Erman, writing in 1849, prefaces his abstract of Popof's memoir of 1846, by the remark:

> It is to be regretted that the paper kite which in Franklin's hands brought us such important conclusions as to the electricity of the atmosphere is now scracely noticed by physicists. By giving it a proper size this apparatus can, however, be applied with great advantage to the determination of the temperature, the wind direction, and the quantity of aqueous vapor in the upper strata of the atmosphere. Indeed for small altitudes it has some advantage over balloons, since kites stand for a long time almost immovable so that one can determine the altitude by other means than by angular measurements which take up much time and demand special apparatus. For such altitude determinations the equation of the curved line formed by the kite-string seems appropriate and therefore the mathematical expressions leading to this end will here be given, and the meteorologists will have to use these in order to determine the altitude of the kite itself or the altitude of any point on its string.
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> Erman adds that if elastic springs be inserted in the kite line at the reel and again higher up say at the kite and records be made of the tensions at any moment then a simple formula will give the altitude of the upper spring.

We need hardly repeat the mathematical formulas of Popof, or Erman's improvements thereon; they may well be useful when the kites are not too high and the wind fairly uniform, but are not adapted to the irregularities of atmospheric currents and will not give the accuracy demanded in the modern practise of flying many kites tandem in order to attain the great altitudes that the Hargrave kite has now brought within our reach. It is interesting to reflect that if Professor Popof could have put his ideas into practical execution in Russia in 1846 meteorology might have gained fifty years over its present condition. As a rule, however, knowledge progresses by a system of irregular steps, first an idea, then an experiment; first the failure of an old theory then the starting of a new theory. Observation, experiment, hypothesis, philosophy, and theory follow each other in rapid succession. Mathematical seminaries, experimental laboratories, and observations under natural conditions must all be maintained. The progress of every branch of science as recorded in the literature of the last three hundred years shows an instructive series of failures and successes. The experiments of Alexander Wilson in 1749 were not repeated until the importance of upper air exploration was realized and until the students of the modern weather map perceived that long-range forecasts and even daily forecasts will never become satisfactory until we fully understand the upper currents and the general circulation of the atmosphere. It is to the study of this latter subject that kites and balloons, mountain stations and cloud observations are now essential, while the interpretation of the results needs the help of the best mathematical physicists.

It is often stated as a reproof to eminent philosophers that they are not "practical" that they "know" but can not "do." However, in the case of Popof, as of very many meteorologists, the money needed for practical work was not available and he could only mark out the methods and the paths for others to pursue. Fortunate is the "practical man" who has reliable theoretical men to guide him in the exploration of nature. The captain of a vessel would be hopelessly lost at sea if there was no navigating officer to show the course.—*C. A.*

FORECASTING ON THE PACIFIC COAST.

By Prof. ALEXANDER G. MCADIE. Dated San Francisco, Cal., February 4, 1908.

In an address delivered before the British Association in 1902, Prof. Arthur Schuster exprest the opinion that "meteorology might be advanced more rapidly if all routine observations were stopped for a period of five years, the energy of observers being concentrated on the discussion of the results already obtained." The accompanying article describes an attempt to partially meet the criticism by utilizing, for forecasting work on the Pacific coast, the charts published each month in the MONTHLY WEATHER REVIEW. No working meteorologist will fully agree with Doctor Schuster's opinion exprest above; yet the need of further study of the data now accumulated is evident and the limitations of our present methods manifest. And yet, has not too much been expected in the matter of forecasts. If not at the present time, certainly in the past, results have been expected entirely incommensurate with the facts and data furnished. Nor is there any present method of verification which does or can do full justice to the forecaster.

In recent years the recognition of the part played by the larger pressure areas, the so-called permanent and subpermanent continental and oceanic areas, has given the forecaster a possible means for undertaking seasonal forecasts with some prospect of success. The importance of extending the area of reports is now more than ever recognized. With the exception of the exploration of the upper air, the study of seasonal displacements of the areas of sea-level pressure offers the most promising field for helpful work in forecasting.

Over the Pacific Ocean, plainly, not less but more observations are needed. Absence of reports now handicaps the forecasters on the Asiatic as well as on the American side of the Pacific. It is conceivable that with a close working cooperation between the Japanese, Indian, Chinese, and Philippine weather services and those of Mexico and the United States, including Alaska and British Columbia, aided by the receipt of wireless weather messages from vessels at sea, the forecasting officials of these services would be in a position to undertake general forecasts for a period of a week or longer, eventually determining seasonal forecasts. And it may not be amiss to call attention to the excellent work done in forecasting on the Pacific coast, and to say that, valuable as the daily forecasts have been, the same degree of efficiency for